WHAT IS CLAIMED IS

1. A method for shifting perspective in a composite image derived from a plurality of images including a first image and a second image, the composite image including the first image as a center of projection and a modified version of the second image, the modified version of the second image being corrected for perspective distortion relative to the first image, the method comprising:

receiving an instruction to shift perspective to make the second image the center of projection of the composite image;

determining a transformation for mapping a set of reference points in the modified version of the second image to a corresponding set of reference points in the second image; and

transforming the first image and the modified version of the second image based on the transformation to generate a modified version of the first image and the second image.

2. The method of claim 1, further comprising:

merging the modified version of the first image and the second image to form a second composite image that has the second image as its center of projection.

3. The method of claim 1, wherein the plurality of images includes a third image and the composite image includes a first modified version of the third image, the first modified version of the third image being corrected for perspective distortion relative to the first image, the method further comprising:

transforming the first modified version of the third image based on the transformation to derive a second modified version of the third image, the second modified version of the third image being corrected for perspective distortion relative to the second image; and

merging the modified version of the first image, the second image, and the second modified version of the third image to form a second composite image.

4. The method of claim 1, wherein:

the reference points in the modified version of the second image include four non-collinear and non-coincident points in the modified version of the second image; and

the reference points in the second image include four non-collinear and non-coincident points in the second image.

5. The method of claim 1, wherein:

the second image and the modified version of the second image each include a perimeter; and

the reference points in the second image and the modified version of the second image are vertices on the perimeters of the second image and the modified version of the second image.

6. The method of claim 5, wherein:

the first image includes a plurality of pixels and has a perimeter that defines a set of vertices; and

transforming the first image based on the transformation includes:

transforming the vertices of the first image; and

transforming the pixels of the first image based on the transformation of the vertices.

7. The method of claim 6, wherein:

the transformation is represented as a transformation matrix.

8. The method of claim 7, wherein:

the transformation matrix is derived from the vertices of the modified version of the second image.

9. The method of claim 8, wherein:

the transformation matrix is further derived from the vertices of the second image.

10. The method of claim 9, wherein the transformation matrix, M, is given by:

$$M = \begin{bmatrix} q_4 - q_5 q_7 & q_5 q_6 - q_3 & q_3 q_7 - q_4 q_6 \\ q_2 q_7 - q_1 & q_0 - q_2 q_6 & q_1 q_6 - q_0 q_7 \\ q_1 q_5 - q_2 q_4 & q_2 q_3 - q_0 q_5 & q_0 q_4 - q_1 q_3 \end{bmatrix}$$

where:

$$\begin{bmatrix} q_0 \\ q_1 \\ q_2 \\ q_3 \\ q_4 \\ q_5 \\ q_6 \\ q_7 \end{bmatrix} = \begin{bmatrix} u_0 & v_0 & 1 & 0 & 0 & 0 & -u_0x_0 & -v_0x_0 \\ u_1 & v_1 & 1 & 0 & 0 & 0 & -u_1x_1 & -v_1x_1 \\ u_2 & v_2 & 1 & 0 & 0 & 0 & -u_2x_2 & -v_2x_2 \\ u_3 & v_3 & 1 & 0 & 0 & 0 & -u_3x_3 & -v_3x_3 \\ 0 & 0 & 0 & u_0 & v_0 & 1 & -u_0y_0 & -v_0y_0 \\ 0 & 0 & 0 & u_1 & v_1 & 1 & -u_1y_1 & -v_1y_1 \\ 0 & 0 & 0 & u_2 & v_2 & 1 & -u_2y_2 & -v_2y_2 \\ 0 & 0 & 0 & u_3 & v_3 & 1 & -u_3y_3 & -v_3y_3 \end{bmatrix}^{-1} \begin{bmatrix} x_0 \\ x_1 \\ x_2 \\ x_3 \\ y_0 \\ y_1 \\ y_2 \\ y_3 \end{bmatrix}$$

$(u_0, v_0), (u_1, v_1), (u_2, v_2), (u_3, v_3)$ are coordinates of vertices of the second image, and

$(x_0, y_0), (x_1, y_1), (x_2, y_2), (x_3, y_3)$ are coordinates of vertices of the modified version of the second image.

11. The method of claim 1, wherein:

the reference points in the modified version of the second image are corner points on a trapezoid formed by a perimeter of the modified version of the second image; and

the reference points in the second image are corner points on a rectangle formed by a perimeter of the second image.

12. The method of claim 1, wherein:

transforming the modified version of the second image alters the shape of a perimeter of the modified version of the second image by moving at least one reference point relative to at least one other reference point.

13. The method of claim 1, wherein:

the modified version of the second image has a perimeter forming a trapezoid; and

transforming the modified version of the second image alters the perimeter of the modified version of the second image to form a rectangle.

14. The method of claim 1, wherein:

the instruction to shift perspective is received as a single user input; and

the determining and transforming steps are automatically performed in response to the user input.

15. A computer-implemented image processing method, comprising:

providing a composite image derived from a plurality of images including a first image and a second image, the composite image including the first image as a center of projection and a modified version of the second image, the modified version of the second image being corrected for perspective distortion relative to the first image;

receiving a single user input including an instruction to change the perspective of the composite image to make the second image the center of projection; and

in response to the input, automatically:

determining a transformation for mapping a set of reference points in the modified version of the second image to a set of reference points in the second image;

transforming each of the plurality of images based on the transformation to obtain the second image and a set of one or more images corrected for distortion relative to the second image; and

merging the second image and the set of one or more images corrected for distortion relative to the second image to form a second composite image that has the second image as its center of projection.

16. A computer program product, tangibly stored on a computer-readable medium, for shifting perspective in a composite image derived from a plurality of images including a first image and a second image, the composite image including the first image as a center of projection and a modified version of the second image, the modified version of the second

image being corrected for perspective distortion relative to the first image, the product comprising instructions operable to cause a programmable processor to:

receive an instruction to shift perspective to make the second image the center of projection of the composite image;

determine a transformation for mapping a set of reference points in the modified version of the second image to a corresponding set of reference points in the second image; and

transform the first image and the modified version of the second image based on the transformation to generate a modified version of the first image and the second image.

17. The computer program product of claim 16, further comprising instructions operable to cause a programmable processor to:

merge the modified version of the first image and the second image to form a second composite image that has the second image as its center of projection.

18. The computer program product of claim 16, wherein the plurality of images includes a third image and the composite image includes a first modified version of the third image, the first modified version of the third image being corrected for perspective distortion relative to the first image, the product further comprising instructions operable to cause a programmable processor to:

transform the first modified version of the third image based on the transformation to derive a second modified version of the third image, the second modified version of the third image being corrected for perspective distortion relative to the second image; and

merge the modified version of the first image, the second image, and the second modified version of the third image to form a second composite image.

19. The computer program product of claim 16, wherein:

the reference points in the modified version of the second image include four non-collinear and non-coincident points in the modified version of the second image; and

the reference points in the second image include four non-collinear and non-coincident points in the second image.

20. The computer program product of claim 16, wherein:

the second image and the modified version of the second image each include a perimeter; and

the reference points in the second image and the modified version of the second image are vertices on the perimeters of the second image and the modified version of the second image.

21. The computer program product of claim 20, wherein:

the first image includes a plurality of pixels and has a perimeter that defines a set of vertices; and

the instructions operable to cause a programmable processor to transform the first image based on the transformation include instructions operable to cause a programmable processor to:

transform the vertices of the first image; and

transform the pixels of the first image based on the transformation of the vertices.

22. The computer program product of claim 21, wherein:

the transformation is represented as a transformation matrix.

23. The computer program product of claim 22, wherein:

the transformation matrix is derived from the vertices of the modified version of the second image.

24. The computer program product of claim 23, wherein:

the transformation matrix is further derived from the vertices of the second image.

25. The computer program product of claim 24, wherein the transformation matrix, M, is given by:

$$M = \begin{bmatrix} q_4 - q_5 q_7 & q_5 q_6 - q_3 & q_3 q_7 - q_4 q_6 \\ q_2 q_7 - q_1 & q_0 - q_2 q_6 & q_1 q_6 - q_0 q_7 \\ q_1 q_5 - q_2 q_4 & q_2 q_3 - q_0 q_5 & q_0 q_4 - q_1 q_3 \end{bmatrix}$$

where:

$$\begin{bmatrix} q_0 \\ q_1 \\ q_2 \\ q_3 \\ q_4 \\ q_5 \\ q_6 \\ q_7 \end{bmatrix} = \begin{bmatrix} u_0 & v_0 & 1 & 0 & 0 & 0 & -u_0x_0 & -v_0x_0 \\ u_1 & v_1 & 1 & 0 & 0 & 0 & -u_1x_1 & -v_1x_1 \\ u_2 & v_2 & 1 & 0 & 0 & 0 & -u_2x_2 & -v_2x_2 \\ u_3 & v_3 & 1 & 0 & 0 & 0 & -u_3x_3 & -v_3x_3 \\ 0 & 0 & 0 & u_0 & v_0 & 1 & -u_0y_0 & -v_0y_0 \\ 0 & 0 & 0 & u_1 & v_1 & 1 & -u_1y_1 & -v_1y_1 \\ 0 & 0 & 0 & u_2 & v_2 & 1 & -u_2y_2 & -v_2y_2 \\ 0 & 0 & 0 & u_3 & v_3 & 1 & -u_3y_3 & -v_3y_3 \end{bmatrix}^{-1} \begin{bmatrix} x_0 \\ x_1 \\ x_2 \\ x_3 \\ y_0 \\ y_1 \\ y_2 \\ y_3 \end{bmatrix}$$

$(u_0, v_0), (u_1, v_1), (u_2, v_2), (u_3, v_3)$ are coordinates of vertices of the second image, and

$(x_0, y_0), (x_1, y_1), (x_2, y_2), (x_3, y_3)$ are coordinates of vertices of the modified version of the second image.

26. The computer program product of claim 16, wherein:

the reference points in the modified version of the second image are corner points on a trapezoid formed by a perimeter of the modified version of the second image; and

the reference points in the second image are corner points on a rectangle formed by a perimeter of the second image.

27. The computer program product of claim 16, wherein:

the instructions operable to cause a programmable processor to transform the modified version of the second image are operable to cause the programmable processor to alter the shape of a perimeter of the modified version of the second image by moving at least one reference point relative to at least one other reference point.

28. The computer program product of claim 16, wherein:

the modified version of the second image has a perimeter forming a trapezoid; and

the instructions operable to cause a programmable processor to transform the modified version of the second image are operable to cause the programmable processor to alter the perimeter of the modified version of the second image to form a rectangle.

29. The computer program product of claim 15 wherein:

the instruction to shift perspective is received as a single user input; and

the product includes instructions to cause the programmable processor to determine the transformation and transform the images automatically in response to the user input.

30. A computer program product, tangibly stored on a computer-readable medium, for processing an image, comprising instructions operable to cause a programmable processor to:

receive a composite image derived from a plurality of images including a first image and a second image, the composite image including the first image as a center of projection and a modified version of the second image, the modified version of the second image being corrected for perspective distortion relative to the first image;

receive a single user input including an instruction to change the perspective of the composite image to make the second image the center of projection; and

in response to the input, automatically:

determine a transformation for mapping a set of reference points in the modified version of the second image to a set of reference points in the second image;

transform each of the plurality of images based on the transformation to obtain the second image and a set of one or more images corrected for distortion relative to the second image; and

merge the second image and the set of one or more images corrected for distortion relative to the second image to form a second composite image that has the second image as its center of projection.